

Feb-02-05 06:48pm

From-Moser, Patterson & Sheridan L.L.P.

+713 623 4846

T-453 P.012/022

Confirmation Report - Memory Send

COPY

Page : 001  
Date & Time: Mar-26-04 03:41pm  
Line 1 : +713 623 4846  
Line 2 :  
E-mail :  
Machine ID : Moser, Patterson & Sheridan L.L.P.

Job number : 389  
Date : Mar-26 03:39pm  
To : 17038729306  
Number of pages : 007  
Start time : Mar-26 03:39pm  
End time : Mar-26 03:41pm  
Pages sent : 007  
Status : OK  
Job number : 389

\*\*\* SEND SUCCESSFUL \*\*\*

MOSER,  
PATTERSON &  
SHERIDAN, LLP  
ATTORNEYS AT LAW

2040 Post Oak Blvd., Suite 300  
Houston, TX 77056-4944  
TEL 713.623.4846  
FAX 713.623.4946  
WWW.MPSL1.COM

FACSIMILE COVER SHEET

DATE: March 26, 2004  
FILE NO:  
TO:  
FAX NO:  
COMPANY:  
FROM:  
PAGE(S) with cover:  
ORIGINAL TO FOLLOW?

AMAT/1831.P1/CPV/COPPER/PJS

Examiner: Ginette Peralta

703-872-8308

USPTO

Keith M. Tackett

7

YES  NO

RULE 312 AMENDMENT AFTER ALLOWANCE  
Reliability Barrier Integration for CU Application

TITLE:

U.S. SERIAL NO.:

FILING DATE:

INVENTOR:

EXAMINER:

GROUP ART UNIT:

CONFIRMATION NO.:

10/052,681

January 17, 2002

XI, et al.

Ginette Peralta

2874

4083

CONFIDENTIALITY NOTE

The document accompanying this facsimile transmission contains information from the law firm of Moser, Patterson & Sheridan, LLP, which is confidential or privileged. The information is intended to be for the use of the individual or entity named on this transmission sheet. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this faxed information is prohibited. If you have received this facsimile in error, please notify us by telephone immediately so that we can arrange for the return of the original documents at no cost to you.

248004\_1

**COPY**

PA1ENT  
Atty. Dkt AMAT/1931.P1/CPI/COPPER/PJS

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:  
Xi, et al.**

Serial No.: 10/052,681

Confirmation No.: 4083

Filed: January 17, 2002

## For: Reliability Barrier Integration for CU Application

ଶ୍ରୀ କମଳାଚାର୍ଯ୍ୟ

Group Art Unit: 2814

**Examiner:** Ginette Peralta

**MAIL STOP ISSUE FEE**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**CERTIFICATE OF FACSIMILE  
TRANSMISSION UNDER 37 CFR 1.8**

## **RULE 312 AMENDMENT AFTER ALLOWANCE**

Following mailing of a Notice of Allowance on December 31, 2003, Applicants request entry of the following amendment to correct the dependency of an allowed claim. **Amendments to the Claims** are shown in the listing of the claims beginning on page 2 of this paper. Remarks begin on page 8 of this paper.

**COPY****IN THE CLAIMS:**

Please amend the claims as follows:

1. (Previously Presented) A method of filling one or more of a via and a trench in a patterned substrate, comprising:
  - a) depositing a generally conformal first barrier layer in one or more of the via and the trench on the patterned substrate by chemical vapor deposition, wherein the first barrier layer is selected from the group consisting of  $TiSi_xN$ ,  $TiN(C)$ ,  $TiNSi(C)$ ,  $Ta$ ,  $TaC$ ,  $TaN(C)$ ,  $TaNSi(C)$ ,  $W$ ,  $WN_x$ ,  $SiO_xN_y$ ,  $SiC$ ,  $AlN$ , and  $Al_2O_3$ ;
  - b) removing the first barrier layer from the horizontal surfaces of the patterned substrate;
  - c) depositing a second barrier layer by physical vapor deposition; and then
  - d) depositing one or more conductive materials.
2. (Original) The method of claim 1 wherein depositing the conductive material comprises depositing a seed layer and a metal layer in the via and/or the trench after the second barrier layer is deposited.
3. (Previously Presented) The method of claim 2 wherein the first barrier layer is selected from the group consisting of  $TiN(C)$ ,  $Ta$ ,  $TaC$ ,  $TaN(C)$ ,  $W$ ,  $WN_x$ ,  $SiC$ ,  $AlN$ , and  $Al_2O_3$ .
4. (Previously Presented) The method of claim 1 wherein the second barrier layer is selected from the group consisting of  $Ta$ ,  $TaN$ ,  $TiSiN_x$ ,  $TaSiN_x$ ,  $W$ , and  $WN_x$ .
5. (Currently Amended) The method of claim [4] 2 wherein the seed layer is copper.
6. (Original) The method of claim 5 wherein the metal layer is copper.

**COPY**

7. (Original) The method of claim 1 wherein the first barrier layer is deposited and removed from the horizontal surfaces of the patterned substrate within a single chamber of an integrated processing tool.
8. (Original) The method of claim 7 wherein the chamber is a chemical vapor deposition chamber and the first barrier layer is deposited and etched in the chamber.
9. (Original) The method of claim 2 wherein the seed layer is deposited by physical vapor deposition.
10. (Original) The method of claim 2 wherein the seed layer is deposited by chemical vapor deposition.
11. (Original) The method of claim 2 wherein the seed layer is deposited by electroless deposition.
12. (Original) The method of claim 2 wherein the metal layer is deposited by physical vapor deposition.
13. (Original) The method of claim 2 wherein the metal layer is deposited by chemical vapor deposition.
14. (Original) The method of claim 2 wherein the metal layer is deposited by electroplating.
15. (Original) The method of claim 1 wherein the via has an aspect ratio of about 4 to 1 and the trench has an aspect ratio of about 1 to 1.
16. (Original) The method of claim 1 wherein the second barrier layer has a thickness of from about 20 Å to about 50 Å at the bottom of the via.

**COPY**

PATENT

Atty. Dkt AMAT/1931.P1/CPU/COPPER/PJS

17. (Original) The method of claim 1 wherein the second barrier layer is selected from the group consisting of Ta, TaN, W, WN<sub>x</sub>, Ti, and TiN, and the second barrier layer has a thickness of from about 20 Å to about 50 Å at the bottom of the via.

18. (Original) A method of filling one or more of a via and a trench in a patterned substrate, comprising:

- a) depositing a generally conformal first barrier layer on the patterned substrate by atomic layer deposition;
- b) removing the first barrier layer from the horizontal surfaces of the patterned substrate;
- c) depositing a second barrier layer by physical vapor deposition; and then
- d) depositing one or more conductive materials.

19. (Original) The method of claim 18 wherein depositing the conductive material comprises depositing a seed layer and a metal layer in the via and/or the trench after the second barrier layer is deposited.

20. (Original) The method of claim 19 wherein the first barrier layer is selected from the group consisting of Ta, TaN, W, and WN.

21. (Original) The method of claim 20 wherein the second barrier layer is selected from the group consisting of Ta, TaN, TiSiN<sub>x</sub>, TaSiN<sub>x</sub>, W, and WN<sub>x</sub>.

22. (Original) The method of claim 21 wherein the seed layer is copper.

23. (Original) The method of claim 22 wherein the metal layer is copper.

24. (Original) The method of claim 18 wherein the first barrier layer is deposited and removed from the horizontal surfaces of the patterned substrate within a single chamber of an integrated processing tool.

**COPY**

25. (Original) The method of claim 24 wherein the chamber is an atomic layer deposition chamber and the first barrier layer is deposited and etched in the chamber.

26. (Original) The method of claim 19 wherein the seed layer is deposited by physical vapor deposition.

27. (Original) The method of claim 19 wherein the seed layer is deposited by chemical vapor deposition.

28. (Original) The method of claim 19 wherein the seed layer is deposited by electroless deposition.

29. (Original) The method of claim 19 wherein the metal layer is deposited by physical vapor deposition.

30. (Original) The method of claim 19 wherein the metal layer is deposited by chemical vapor deposition.

31. (Original) The method of claim 19 wherein the metal layer is deposited by electroplating.

32. (Original) The method of claim 18 wherein the via has an aspect ratio of about 4 to 1 and the trench has an aspect ratio of from about 1 to about 1.

33. (Original) The method of claim 18 wherein the second barrier layer has a thickness of from about 20 Å to about 50 Å at the bottom of the via.

34. (Original) The method of claim 18 wherein the second barrier layer is selected from the group consisting of Ta, TaN, W, WN<sub>x</sub>, Ti, and TiN, and the second barrier layer has a thickness of from about 20 Å to about 50 Å at the bottom of the via.

**COPY**

PATENT

Atty. Dkt AMAT/1931.P1/CPI/COPPER/PJS

35. (Original) A method of filling one or more of a via and a trench in a patterned substrate having an etch stop at the via level, comprising:

- a) depositing a generally conformal first barrier layer on the patterned substrate by chemical vapor deposition;
- b) removing the first barrier layer from the horizontal surfaces of the patterned substrate;
- c) removing the etch stop from the bottom of the via;
- d) depositing a second barrier layer by physical vapor deposition; and then
- e) depositing one or more conductive materials.

36. (Original) The method of claim 35 wherein depositing the conductive material comprises depositing a seed layer and a metal layer in the via and/or the trench after the second barrier layer is deposited.

37. (Previously Presented) A method of filling one or more of a via and a trench in a patterned substrate having a metal layer underlying the via, comprising:

- a) depositing a generally conformal first barrier layer on the patterned substrate by chemical vapor deposition, wherein the first barrier layer is selected from the group consisting of  $TiSi_xN$ ,  $TiN(C)$ ,  $TiNSi(C)$ ,  $Ta$ ,  $TaC$ ,  $TaN(C)$ ,  $TaNSi(C)$ ,  $W$ ,  $WN_x$ ,  $SiO_xN_y$ ,  $SiC$ ,  $AlN$ , and  $Al_2O_3$ ;
- b) removing the first barrier layer from the horizontal surfaces of the patterned substrate;
- c) depositing by physical vapor deposition a second barrier layer sufficient to provide a barrier on the bottom of the trench without significantly impairing conduction between the conductive material deposited in the via and the metal layer ; and then
- d) depositing one or more conductive materials.

38. (Original) A method of filling one or more of a via and a trench in a patterned substrate having a metal layer underlying the via, comprising:

- a) depositing a generally conformal first barrier layer on the patterned substrate by atomic layer deposition;

Feb-02-05

06:50pm

From-Moser, Patterson & Sheridan L.L.P.

+713 623 4846

T-453 P.019/022 F-507

COPY

PATENT

Atty. Dkt AMAT/1931.P1/CPI/COPPER/PJS

- b) removing the first barrier layer from the horizontal surfaces of the patterned substrate;
- c) depositing by physical vapor deposition a second barrier layer sufficient to provide a barrier on the bottom of the trench without significantly impairing conduction between the conductive material deposited in the via and the metal layer ; and then
- d) depositing one or more conductive materials.

**COPY**PATENT  
Atty. Dkt AMAT/1931,P1/CPI/COPPER/PJS**REMARKS**

This amendment is filed to correct the dependency of claim 5 to provide antecedent basis for the phrase "seed layer" in claim 5. Applicants believe that no new matter has been introduced in this response. Entry of the amendment is respectfully requested.

Respectfully submitted,



Keith M. Tackett  
Keith M. Tackett  
Registration No. 32,008  
MOSER, PATTERSON & SHERIDAN, L.L.P.  
3040 Post Oak Blvd. Suite 1500  
Houston, TX 77056  
Telephone: (713) 623-4844  
Facsimile: (713) 623-4846  
Agent for Applicant(s)

256944\_1

**Confirmation Report - Memory Send**

Page : 001  
 Date & Time: Mar-04-04 05:50pm  
 Line 1 : +713 623 4846  
 Line 2 :  
 E-mail :  
 Machine ID : Moser, Patterson & Sheridan L.L.P.

Job number : 557  
 Date : Mar-04 05:49pm  
 To : 17038729306  
 Number of pages : 009  
 Start time : Mar-04 05:49pm  
 End time : Mar-04 05:50pm  
 Pages sent : 009  
 Status : OK  
 Job number : 557

**COPY**

**MOSER**  
**PATTERSON &**  
**SHERIDAN, LLP**  
 ATTORNEYS AT LAW

3040 Post Oak Blvd., Suite 1500  
 Houston, TX 77056-0582  
 TEL 713.523.4844  
 FAX 713.523.4846  
[www.MPSLL.com](http://www.MPSLL.com)

**FACSIMILE COVER SHEET**

**DATE:** March 4, 2004  
**FILE NO.:** 7-MAT/1931-P1/CP/COPPER/PJS  
**TO:** Examiner: Ginette Peralta  
**FAX NO.:** 703-872-8306  
**COMPANY:** USPTO  
**FROM:** Keith M. Tackett  
**PAGE(S) with cover:** 21  
**ORIGINAL TO FOLLOW?**  YES  NO

**RULE 312 AMENDMENT AFTER ALLOWANCE**

**TITLE:** Re liability Barrier Integration for GU Application  
**U.S. SERIAL NO.:** 07052,681  
**FILING DATE:** January 17, 2002  
**INVENTOR:** et al.  
**EXAMINER:** Ginette Peralta  
**GROUP ART UNIT:** 2814  
**CONFIRMATION NO.:** 1083

**CONFIDENTIALITY NOTE**

The document accompanying this facsimile transmission contains information from the law firm of Moser, Patterson & Sheridan, LLP, which is confidential or privileged. The information is intended to be for the use of the individual or entity named on this transmission sheet. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this faxed information is prohibited. If you have received this facsimile in error, please notify us by telephone and advise so that we can arrange for the retrieval of the original documents at no cost to you.

ebook3\_1



## Auto-Reply Facsimile Transmission

**COPY**

TO: Fax Sender at +7136234846  
**Fax Information**  
 Date Received: 3/4/2004 5:44:42 PM [Eastern Standard Time]  
 Total Pages: 9 (including cover page)

**ADVISORY:** This is an automatically generated return receipt confirmation of the facsimile transmission received by the Office. Please check to make sure that the number of pages listed as received in Total Pages above matches what was intended to be sent. Applicants are advised to retain this receipt in the unlikely event that proof of this facsimile transmission is necessary. Applicants are also advised to use the certificate of facsimile transmission procedures set forth in 37 CFR 1.8(a) and (b), 37 CFR 1.6(f). Trademark Applicants, also see the Trademark Manual of Examining Procedure (TMEP) section 306 et seq.

Received  
Cover  
Page  
=====>

Feb-04-04	06:45pm	From-Moser, Patterson & Sheridan L.L.P.	+713 623 4846	T-457	P.021/022	F-507
<b>MOSER PATTERSON &amp; SHERIDAN, LLP</b> <small>ATTORNEYS AT LAW</small>				1210 Post Oak Lane, Suite 1500 Houston, TX 77056-4032 Tel. 713.524.0202 Fax 713.524.0204 FAX: 713.524.0205		
<b>FACSIMILE COVER SHEET</b>						
<b>DATE:</b>	March 4, 2004					
<b>FILE NO.:</b>	7MAT71031.P1/CP/COPPER/PJS					
<b>TO:</b>	Examiner: Giacinto Povalto					
<b>FAX NO.:</b>	703-434-0306					
<b>COMPANY:</b>	USPTO					
<b>FROM:</b>	Gail M. Yankell					
<b>PAGE(S) WITH COVER:</b>	2					
<b>ORIGINAL TO FOLLOW?</b>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					
<b>RULE 312 AMENDMENT AFTER ALLOWANCE</b>						
<b>TITLE:</b>	Inhalation Barrier Integration for GU Applications					
<b>U.S. SERIAL NO.:</b>	0/062,681					
<b>FILING DATE:</b>	January 17, 2002					
<b>INVENTOR:</b>	Jd, et al.					
<b>EXAMINER:</b>	Giacinto Povalto					
<b>GROUP ART UNIT:</b>	2814					
<b>CONFIRMATION NO.:</b>	4025					
<b>CONFIDENTIALITY NOTICE</b>						
The document accompanying this facsimile transmission contains information from the law firm of Moser, Patterson & Sheridan, LLP, which is confidential or privileged. The information is intended to be for the use of the law firm or the individual or entity named on this transmission sheet. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this faxed information is prohibited. If you have received this facsimile in error, please notify us by telephone immediately so that we can arrange for the return of the original documents as no copy						
CFS001						
PAGE 19 "RCVD AT 2/2/2005 6:44:12 PM [Eastern Standard Time]" SVR:USPTO-EFXRF-1/3 * DNIS:8729306 * CSID:+7136234846 * DURATION (mm:ss):05:12						

Feb-02-05 06:46pm From-Moser, Patterson & Sheridan L.L.P.

+713 623 4846

T-453 P.001

F-507

MOSER  
PATTERSON &  
SHERIDAN, LLP

ATTORNEYS AT LAW

3040 Post Oak Blvd, Suite 1500  
Houston, TX 77056-6582

TEL 713.623.4844  
FAX 713.623.4846

WWW.MPSLLP.COM

## FACSIMILE COVER SHEET

RECEIVED  
CENTRAL FAX CENTER

FEB 02 2005

**DATE:** February 2, 2005  
**FILE NO.:** AMAT/1931.P1/CPI/COPPER/PJS  
**TO:** Examiner: Ginette Peralta  
**FAX NO.:** 703-872-9306  
**COMPANY:** USPTO  
**FROM:** Keith M. Tackett  
**PAGE(S) with cover:** 22

**ORIGINAL TO FOLLOW?**  YES  NO

### SUBMISSION OF REPLACEMENT DOCUMENTS

**TITLE:** Reliability Barrier Integration for CU Application  
**U.S. SERIAL NO.:** 10/052,681  
**FILING DATE:** January 17, 2002  
**INVENTOR:** Xi, et al.  
**EXAMINER:** Ginette Peralta  
**GROUP ART UNIT:** 2814  
**CONFIRMATION NO.:** 4083

### CONFIDENTIALITY NOTE

The document accompanying this facsimile transmission contains information from the law firm of Moser, Patterson & Sheridan, LLP, which is confidential or privileged. The information is intended to be for the use of the individual or entity named on this transmission sheet. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this faxed information is prohibited. If you have received this facsimile in error, please notify us by telephone immediately so that we can arrange for the retrieval of the original documents at no cost to you.

337955\_1.DOC

PATENT  
Atty. Dkt. No. AMAT/1931.P1/CPI/COPPER/PJS

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:  
Xi, et al.

Serial No.: 10/052,681

Confirmation No.: 4083

Filed: January 17, 2002

For: Reliability Barrier Integration CU  
Application

§§§§§ Group Art Unit: 2814

§§§§§ Examiner: Ginette Peralta

RECEIVED  
CENTRAL FAX CENTER  
FEB 02 2005

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

CERTIFICATE OF FACSIMILE  
TRANSMISSION UNDER 37 CFR 1.8

I hereby certify that this correspondence and the documents referred to as attached therein are being facsimile transmitted to the U.S. Patent and Trademark Office to the fax number indicated by the Examiner, namely, fax number (703) 872-9306 to the attention of the named Examiner, on the date below.

2/2/05Karen Zabel

Date

Signature

Dear Sir:

## SUBMISSION OF REPLACEMENT DOCUMENTS

Applicants note that while the issue fee for the instant application was paid on March 31, 2004, the instant application has not yet issued. The Examiner indicated in a telephone conversation on February 1, 2005 that the issue fee payment and the amendments after allowance filed on March 4, 2004 and March 26, 2004 have been received by the Patent Office, but have not been matched with the file.

Applicants are submitting a copy of the issue fee transmittal and the return receipt postcard indicating that the issue fee transmittal was received by the Patent Office on April 5, 2004. Applicants are also submitting a copy of the amendment after allowance filed March 4, 2004, with its facsimile confirmation and a copy of the amendment after allowance filed March 26, 2004, with its facsimile confirmation.

Page 1

337937\_1.DOC

Feb-02-05

06:46pm From-Moser, Patterson & Sheridan L.L.P.

+713 623 4846

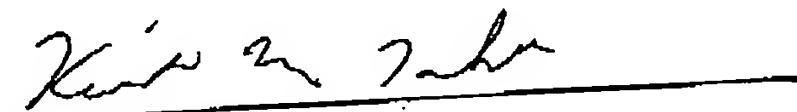
T-453 P.003/022 F507

PATENT

Atty. Dkt. No. AMAT/1931.P1/CPI/COPPER

Applicants are submitting the attached copies to replace the misplaced issue fee transmittal and amendments after allowance to help expedite the issuance of the patent for the instant application.

Respectfully submitted,



Keith M. Tackett  
Registration No. 32,008  
MOSER, PATTERSON & SHERIDAN, L.L.P.  
3040 Post Oak Blvd. Suite 1500  
Houston, TX 77056  
Telephone: (713) 623-4844  
Facsimile: (713) 623-4846  
Agent for Applicant(s)

Page 2

337937\_1

PAGE 3/22 \* RCVD AT 2/2/2005 6:44:14 PM [Eastern Standard Time] \* SVR:USPTO-EFXRF-1/3 \* DNIS:8729306 \* CSID:+7136234846 \* DURATION (mm:ss):05:12

Feb-02-05 06:46pm From-Moser, Patterson &amp; Sheridan L.L.P.

+713 623 4846

T-453 P.004/022 F-507

**'PART B - FEE(S) TRANSMITTAL'**

Complete and send this form, together with applicable fee(s), to: Mail

Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450

or Fax (703) 746-4000

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

32588 7590 12/31/2003

**APPLIED MATERIALS, INC.**  
 2881 SCOTT BLVD. M/S 2061  
 SANTA CLARA, CA 95050

Certificate of Mailing or Transmission  
 I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

Maureen Walstra	(Depositor's name)
<i>Maureen Walstra</i>	(Signature)
3/31/04	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,681	01/17/2002	Ming Xi	AMAT/1931.P1.CPU/ALUMINUM	4083

TITLE OF INVENTION: RELIABILITY BARRIER INTEGRATION FOR CU APPLICATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	03/31/2004
EXAMINER	ART UNIT	CLASS-SUBCLASS			
PERALTA, GINETTE	2814	438-625000			

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

 Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

Moser, Patterson &amp; Sheridan LLP

2 \_\_\_\_\_  
3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

(A) NAME OF ASSIGNEE

Santa Clara, California

APPLIED MATERIALS, INC.

Please check the appropriate assignee category or categories (will not be printed on the patent):  individual  corporation or other private group entity  government

4a. The following fee(s) are enclosed:

 Issue Fee Publication Fee Advance Order - # of Copies 2

4b. Payment of Fee(s):

 A check in the amount of the fee(s) is enclosed. Payment by credit card. Form PTO-2038 is attached. The Director is hereby authorized to charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-1074 (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

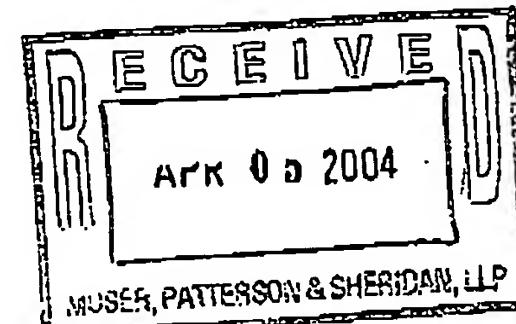
(Authorized Signature)

(Date)

ROBERT W. MULCAHY, Reg. No. 25,436 03/31/04  
 NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



TRANSMIT THIS FORM WITH FEE(S)

**COPY**

Mail Stop Issue Fee  
Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Title RELIABILITY BARRIER INTEGRATION FOR CLO  
APPLICATION  
Inventor Ming Xie et al  
Serial No 10/052,681 Filed 01/17/2002  
Atty Dkt No 001931 P 01 USA / CPI/COPPER

ENCLOSED:

Instructions for Payment of Issue Fee  
Return Receipt Post Card

JJS:mw Mailed: 3/31/04

